

# ABSTRACT

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In accordance with our invention, for two mixture-type probability distribution functions (PDF's),  $G, H$ ,

$$10 \quad G(x) = \sum_{i=1}^N \mu_i g_i(x), \quad H(x) = \sum_{k=1}^K \gamma_k h_k(x),$$

where  $G$  is a mixture of  $N$  component PDF's  $g_i(x)$ ,  $H$  is a mixture of  $K$  component PDF's  $h_k(x)$ ,  $\mu_i$  and  $\gamma_k$  are corresponding weights that satisfy

$$15 \quad \sum_{i=1}^N \mu_i = 1 \quad \text{and} \quad \sum_{k=1}^K \gamma_k = 1;$$

we define their distance,  $D_M(G, H)$ , as

$$20 \quad D_M(G, H) = \min_{w=[\omega_{ik}]} \sum_{i=1}^N \sum_{k=1}^K \omega_{ik} d(g_i, h_k)$$

where  $d(g_i, h_k)$  is the element distance between component PDF's  $g_i$  and  $h_k$  and  $w$  satisfies

$$25 \quad \omega_{ik} \geq 0, \quad 1 \leq i \leq N, \quad 1 \leq k \leq K;$$

and

$$30 \quad \sum_{k=1}^K \omega_{ik} = \mu_i, \quad 1 \leq i \leq N, \quad \sum_{i=1}^N \omega_{ik} = \gamma_k, \quad 1 \leq k \leq K.$$

The application of this definition of distance to various sets of real world data is demonstrated.

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